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MORPHOLOGY OF PSOAS MINOR MUSCLE- A CADAVERIC STUDY

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ABSTRACT

Aim: To study prevalence of psoas minor muscle and its morphology

Material and Method: The study was conducted at R.N.T. Medical College, Udaipur (Rajasthan) in thirty adult embalmed cadavers (23 males and 7 females) of the age group 50 to 60 years.

Results: Psoas minor muscle was present in eight (26.66%) cases. Morphology of muscle showed a wide variation its muscle belly and its tendinous mode of insertion on either pecten pubis (in five cases) or as merging with obturator fascia and iliac fascia (in three cases).

Psoas minor muscle though an inconstant muscle, if present is of clinical importance to radiologists, surgeons and physiotherapists as it can mimic certain abdominal emergencies.

Key Words: Psoas minor muscle, Morphology

INTRODUCTION

Psoas minor muscle is absent in about 40% of the cases. This muscle lies anterior to psoas major, entirely within the abdomen. It arises from the sides of bodies of the twelfth thoracic and first lumbar vertebrae and from the disc between them. It ends in a long tendon which is attached to pecten pubis and iliopectineal eminence while laterally to the iliac fascia. The muscle is a weak flexor of the trunk and is innervated by a branch from first lumbar nerve.¹ Though an inconstant muscle, if present and gets strained, can be a cause of psoas minor syndrome causing pain in lower quadrants of abdomen mimicking abdominal emergencies. It can also lead to difficult ambulation. This study was done to find prevalence of psoas minor muscle in our region and to discuss its clinical implications which can be of importance to Surgeons, Orthopaedist, Physiotherapists and Radiologists.

MATERIALS AND METHOD

This study was done on thirty adult embalmed cadavers at R.N.T. Medical College, Udaipur (Rajasthan) for a period of three years from 2013-2016. All the cadavers were of the age group 50-60 years. Out of thirty cadavers, twenty three

were males and seven were females. None of the selected cadaver had any scar mark of injury or surgery on anterior as well as posterior abdominal wall. Dissection in the abdominal region was done according to the steps described in Cunningham's Manual of Practical Anatomy.² After studying the anterior abdominal wall peritoneum was incised. All the abdominal organs were studied, removed and preserved. Posterior abdominal wall was now exposed. Presence or absence of psoas minor was recorded and photographed

Observations

Following parameters were recorded.

Origin, insertion and total length of the muscle. Length and width of tendon of insertion. Measuring tape was used for recording various parameters.

RESULTS

Out of thirty cadavers studied, eight (i.e. six male and two female cadavers) showed the presence of psoas minor (prevalence was 26.66%).

All the cases had psoas minor bilaterally. (Fig 1, Fig 2, Fig 3).

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No variation was recorded in origin of the muscle and all the cases had normal origin i.e. from T12 and L1 vertebrae and the disc between them.

In five cases (three males and two females) insertion was as a broad tendon on iliopectineal eminence and pecten pubis (Fig 5). Average width of tendon was 1.10cm (muscle belly was also thick in these cases).

In three cadavers (all male) (Fig 4) - insertion was by a thin tendon which fanned out near iliopectineal eminence and merged with obturator fascia medially and iliac fascia laterally. Average width of tendon was 0.73 cm. (muscle belly was also thin in these cases). In one case belly was very thin (Fig 2) and short (length of the muscle belly was 6.5 cm).

Genitofemoral nerve was seen posterior to psoas minor near its origin and then lateral to it near its insertion.

Average length of the belly was 7.18 cm (Range 6.5cm-8.5cm)

Average length of tendon of insertion was 14.94cm (Range 11.5cm-17 cm)

Average width of tendon was 0.94cm (Range 0.75cm - 1.20cm)

DISCUSSION

Psoas minor muscle is an inconstant muscle and is infrequently absent. This muscle is always absent in patients with Trisomy 18. Muscles differentiating late during development are generally affected in these patients.³

Psoas minor muscle though a weak flexor of pelvis in human beings, is well developed in quadrupeds who uses all the four limbs in progression⁴ and also in apes where brachiating is apparent and it is larger than psoas major muscle itself.⁵

Various authors have studied prevalence of psoas minor muscle. According to Anson B J³ in a series of 182 subjects, muscle was present on both sides in 70 subjects and unilaterally in 20 cases (12 on the right side and 8 on the left side).

Sachin et al⁶ have reported this muscle to be absent in 60% of cases while Faria et al⁷ have reported it to be absent in 73.33% of cases. In our study of thirty cadavers we have found muscle to be absent in 73% of cases which is quite similar to the study by Faria et al.⁷

Racial difference in prevalence have also been studied by Hanson et al.⁸ as psoas minor muscle was present bilaterally in 87% of white subjects and unilaterally in 9% of black subjects. Even morphology of muscle was different in blacks and whites. Belly of the muscle was thicker in whites as compared to blacks.

Variation in morphology of muscle was also seen by us. In five cases muscle belly was thick and tendon of insertion was short and broad and was attached to iliopectineal eminence and pecten pubis. But in three cases muscle belly was thin and tendon of insertion was long which fanned out near iliopectineal eminence and merged with obturator fascia medially and iliac fascia laterally.

Presence of psoas minor muscle with its variable size can also cause confusions during magnetic resonance imaging techniques where it may appear like adenopathies⁹

Clinical implications of psoas minor muscle can be of importance to orthopaedist, physiotherapists, surgeons and radiologists who frequently deals patients with pain in lower abdomen or strained muscles.

Psoas minor muscle if present and strained can be a cause of psoas minor syndrome¹⁰ where due to tense muscle and tendon patient complains of pain in corresponding iliac fossa. Pain is aggravated by palpation of this taut tendon in lean individuals. Here it may be mistaken for appendicitis (if present on right side) or diverticulitis. Symptoms in this syndrome appear due to compression of the retroperitoneal neurovascular structures. Tenotomy is the treatment of choice in such cases.

Psoas minor muscle can be strained in games like golf & football where playing with feet off the ground can lead to pain in the inguinal region extending towards the abdominal wall & testis and this can interfere with their ability to run or jump.¹¹

Though psoas minor is an inconstant muscle yet its clinical importance cannot be overlooked by radiologists, physiotherapists and orthopaedist. Detailed knowledge of this muscle is must especially during making clinical diagnosis as well as in procedures carried out in iliac region.

CONCLUSION

Presence or absence of psoas minor muscle is not only of academic interest to anatomists but also for clinicians in making clinical diagnosis (especially in pain abdomen) and during imaging. Limitation to our study was lesser number of cases, but if we select a larger population and support our study by imaging techniques it can be of great use to surgeons and physiotherapists.

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VARIATIONS IN MUSCLE BELLY OF PSOAS MINOR MUSCLE (FIG 1, 2, 3)

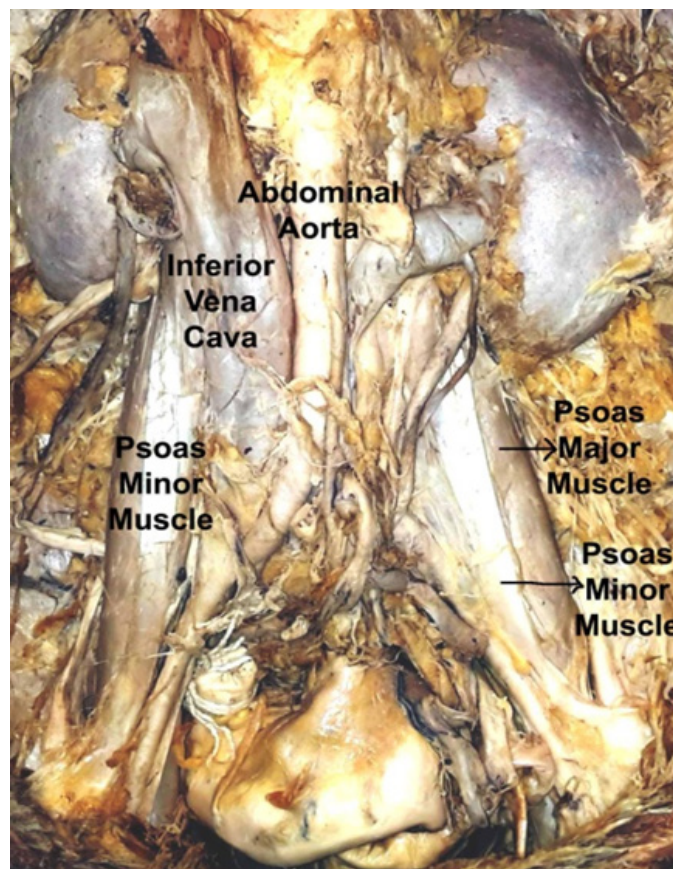


Figure 1: Showing Bilateral Psoas Minor Muscle.

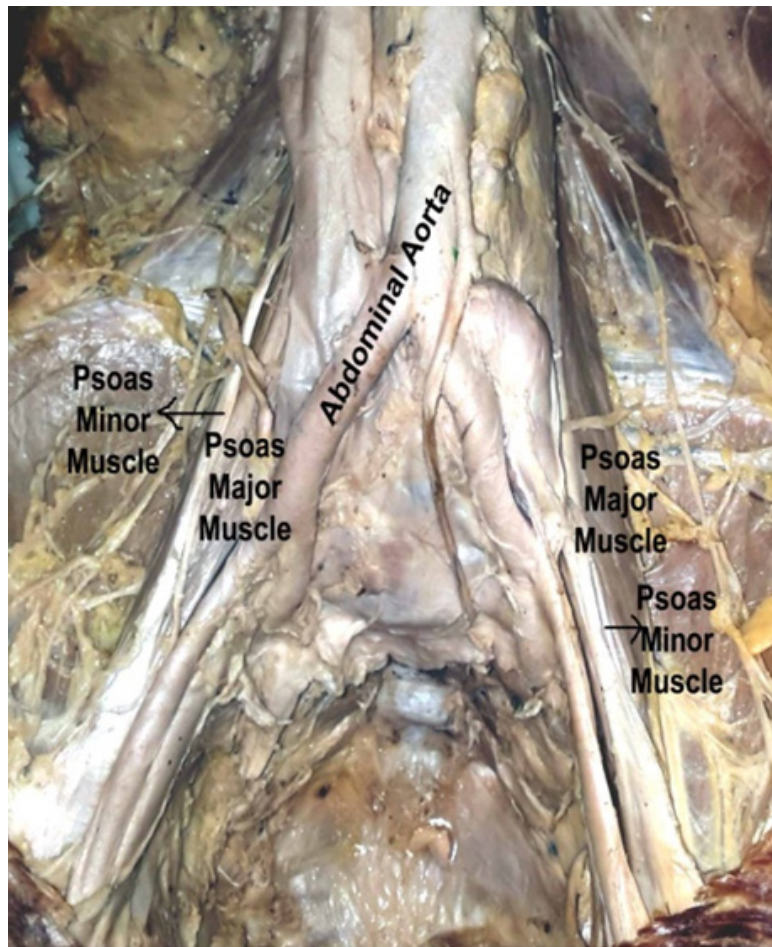


Figure 2: Showing Thin Tendons of Bilateral Psoas Minor Muscle.

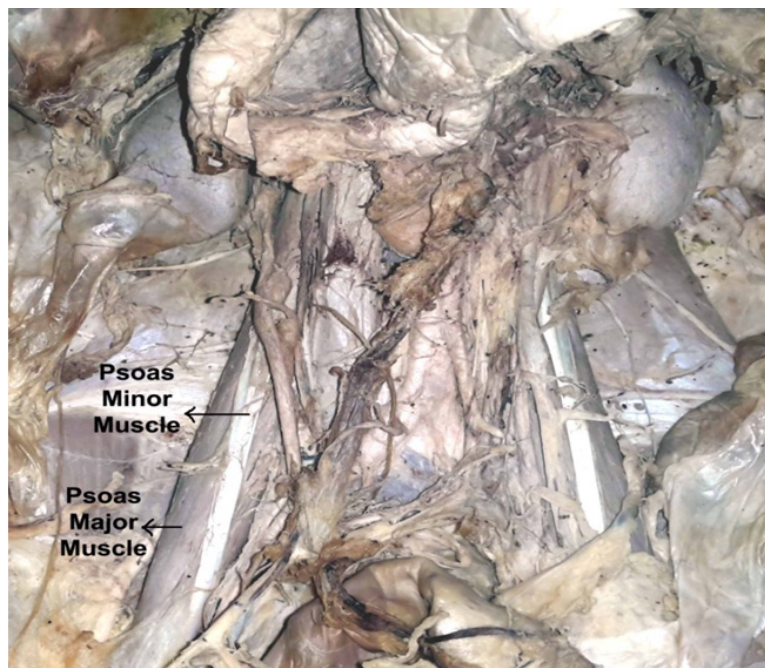


Figure 3: Showing Bilateral Psoas Minor Muscle.

VARIABLE MODES OF INSERTION OF PSOAS MINOR MUSCLE (FIG 4, FIG 5)

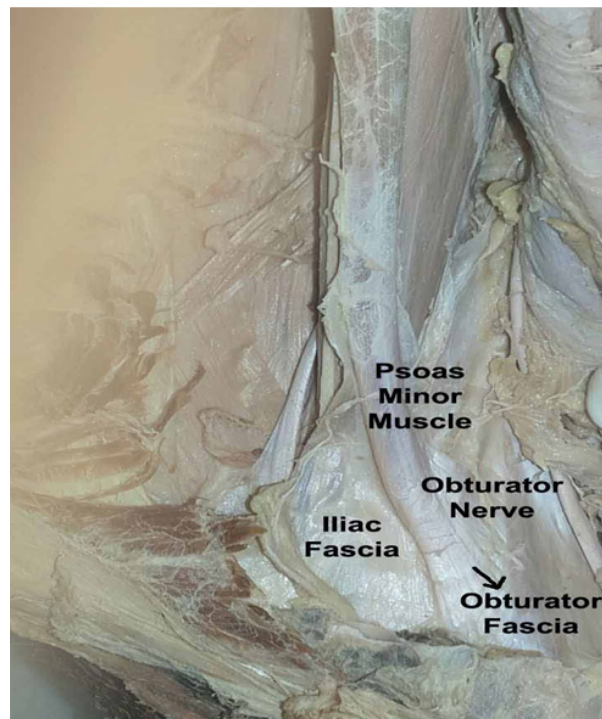


Figure 4: Showing Thin Tendon of Insertion of Psoas Minor Muscle Merging with Obturator Fascia & Iliac Fascia.



Figure 5: Showing Thick Tendon of Insertion of Psoas Minor Muscle on Iliopectineal Eminence.